FAA-E-2744
November 2, 1983

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
SPECIFICATION

Amplifier, RF, Localizer, AN/GRN-27 Replacement

1. SCOPE

1.1 Scope.- The equipment specified herein is a solid state amplifier module, designed to operate over the frequency range of 108.0 to 112.0 MHz as a "drop-in" replacement for the existing "A-4" modules in the existing localizer course and clearance transmitters of the FAA AN/GRN-27(V) ILS system.

2. APPLICABLE DOCUMENTS

2.1 FAA documents.- The following specifications and directive of the issues specified in the invitation for bids or requests for proposal, form a part of this specification:

FAA-G-2100	Electronics Equipment, General Requirement
FAA-STD-013	Quality Program Requirements
Order 1320.33	Equipment Modification and Facility Instruction Directive

2.2 Military specification.- The following military specification of the issues in effect on the date of the invitation for bids or requests for proposal, form a part of this specification and is applicable to the extent specified herein: MIL-E-17555 Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery Of; MIL-HDBK-217, Reliability Stress and Failure Rate Data for Electronic Equipment.

(Copies of this specification and other applicable FAA specifications, standards and directives may be obtained from the Contracting Officer in the FAA office issuing the invitation for bids or requests for proposals. Requests should fully identify materials desired, i.e., specification, standard, amendment, and dates. Requests should cite the invitation for bids, requests for proposals or the contract involved or other use to be made of the requested material.)

(Single copies of military standards and specifications may be requested by mail or telephone from the U.S. Naval Supply Depot, 5810 Tabor Avenue, Philadelphia, Pennsylvania 19120, telephone number (215) 697-3321. Applicable invitation for bids or contract number should be cited.)

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- Each amplifier module furnished by the contractor shall be complete in accordance with all specification documents. In addition, the contractor shall furnish GRN-27 equipment modification instructions for FAA use and revised existing (TI 6750.68A) instruction book manuscript pages for FAA use in accordance with Order 1320.33.

3.2 General system requirements.- Equipment furnished herein shall meet the requirements of this specification and the requirements of specification FAA-G-2100. In the event of conflict, the requirements of this specification shall take precedence over the requirements of the general specification.

3.3 General functional requirements.- The solid state amplifier module specified herein shall be suitable to replace part of the existing transmitters in the GRN-27 localizer systems, specifically the power amplifiers identified by the reference designation prefixes 1A21A4, 1A22A4, 1A25A4 and 1A26A4. The replacement power amplifier specified herein shall be required to interface physically and electronically with the associated equipment without any change required to this equipment.

3.4 Ambient conditions.- The ambient conditions for the transmitter of which the specified power amplifier is part shall be Environment II.

3.5 Frequency range.- The equipment specified herein shall operate in the frequency band 108.0 to 112.0 MHz with no more than one tuning adjustment.

Reliability.- The computed failure rate for the power amplifier specified herein shall not exceed 0.20 failures per million hours. A reliability analysis in accordance with the techniques and data of MIL-HDBK-217 shall be performed to show compliance.

3.7 Harmonics and spurious signals.- All harmonics and spurious signals in the output shall be at least 60 dB below the carrier level for any output in the range from 2.5 watts to 15 watts.

3.8 Audio distortion.- When audio modulated by 1020 Hz to a depth of 20 percent at an output carrier level from 2.5 to 15 watts, the audio distortion shall not exceed 8 percent. When modulated by 90 Hz or 150 Hz up to 50 percent in any combination, the audio distortion shall not exceed 8 percent at an output carrier level from 2.5 to 15 watts.

3.9 Collector efficiency.- The collector efficiency shall be not less than 50 percent in the rf output range from 2.5 to 15 watts and over the specified frequency range.

3.10 Amplifier gain.- With a normal power input to the power amplifier (2 watts), the output shall be at least 15 watts.

3.11 Power output stability.- With constant power input, the power output shall not vary more than ± 5 percent over the specified environment, and the power output shall not vary more than ± 1 dB over the specified frequency range.

3.12 Construction.- The overall dimensions, mounting provisions and input and output terminals of the power amplifier shall be such to allow direct replacement of the existing assembly.

3.13 Overall system requirements. - The solid-state amplifier assembly specified herein is intended as a direct replacement. After its installation in the existing transmitters, the system shall operate within all previously prescribed parameters and tolerances as specified in the existing equipment handbook.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.- The contractor shall establish and maintain a quality control program in accordance with FAA-STD-013. Quality assurance provision specified in paragraph 4 through 4.11 of FAA-G-2100 shall apply.

4.2 Design qualification tests.- In addition to the tests specified in FAA-G-2100, the following design qualification tests shall be conducted under normal test conditions.

Paragraph	Test
3.9 (2.5, 15 watts, 108, 110, 112 MHz)	Collector efficiency
3.12	Interface capability

4.3 Type tests under normal test conditions.-

Paragraph	Test
3.7 (108, 110, 112 MHz)	Harmonics, spurious signals
3.8 (332 MHz)	Audio distortion
3.11 (108, 110, 112 MHz)	Power output stability

4.4 Type tests under the service conditions.- The following tests shall be conducted while subjecting the equipment to the test procedures described in FAA-G-2100:

Paragraph	Test
3.11 (110 MHz)	Power output stability

4.5 Production tests.- The following tests shall be conducted on each equipment under normal test conditions:

Paragraph	Test
3.10 (108, 110, 112 MHz)	Gain

5. PREPARATION FOR DELIVERY

5.1 General.- Unless otherwise specified in the contract, the equipment shall be prepared for domestic shipment in accordance with the following paragraphs.

5.2 Packaging.- Packaging shall be in accordance with Specification MIL-E-17555, Level A, Method II.

5.3 Packing.- Packing shall be in accordance with Specification MIL-E-17555, Level B.

5.4 Marking.- Each package and shipping container shall be durably and legibly marked with the following information:

Name of Item and FA Type Designation
Serial Number(s)
Quantity
Contract Number
Federal Stock Number
Gross Weight of Container
Manufacturer's Name

6. NOTES